5 DIGITAL IMAGE PROCESSING

5.1 Purpose

To improve and clarify the visual appearance of digital images and to prepare images for additional forensic analysis.

5.2 Scope

This procedure applies to all digital images regardless of the original source, including video recordings

5.3 Materials and Equipment

The equipment and materials used may include, but are not limited to the following, as determined by the examiner and the requirements of the evidence.

The computer hardware will be determined at the discretion of the examiner and will be based upon the type and attributes of the digital image(s) and the requirements of the processing operation(s) to be performed. The computer hardware should have storage, processing, and display capabilities that can handle uncompressed data.

- Workstation(s)
- Cables
- Professional monitors

The computer software will be determined at the discretion of the examiner and will be based on the attributes of the digital image(s) and the nature of the processing operation(s) to be applied. Examples of software that might be selected include: Adobe Photoshop, Avid, Signalscape or various proprietary viewing software.

5.4 Limitations

None for this procedure

5.5 Safety

None for this procedure

5.6 Procedures

5.6.1 Ensure that the preliminary examination has been conducted.

5.6.2 If removable digital media, see Protecting Digital Media (Section-6).

5.6.3 Review the submitted file(s) utilizing the appropriate viewing software to locate the AOI and/or video sequences based on the provided information and/or description.

5.6.4 Transfer selected files to an image/video processing workstation, if necessary.

5.6.5 Based on the information provided in reference to the AOI or video sequence(s), select the appropriate digital processing technique(s) to apply to the files.

5.6.5.1 Common digital image processing techniques include, but are not limited to: brightness and contrast adjustment, levels adjustment, sharpening, blurring, color mode adjustment, frame averaging, de-interlacing, cropping and resizing.

5.6.6 Document each step taken and the order they were performed, and if applicable, the appropriate settings used. This documentation can be in the form of printouts that can be produced from a software program, e.g. the history log from Adobe Photoshop.

5.6.7 Visually inspect the results to determine if the processing technique was sufficient to achieve the desired results; if not, repeat the previous steps.

5.6.8 Save the image(s) and/or video stream(s) in a .TIFF file format, uncompressed file format, or other lossless compression format.

5.6.9 Determine the proper output of the results and produce to the desired media.

5.7 References

Owner's Manuals and User's Manuals should be referenced for equipment operating instructions.

Blitzer, Herbert L., and Jack Jacobia. Forensic Digital Imaging and Photography. San Diego: Academic Press, 2002.

Castleman Kenneth R. Digital Image Processing. Upper Saddle River, New Jersey: Prentice Hall, Inc., 1996.

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Davies, Adrian, and Phil Fennessy. Digital Imaging for Photographers. 4th ed. Oxford: Focal Press, 2001.

Matchett, Alan R. CCTV for Security Professionals. Amsterdam: Butterworth – Heinemann, 2003.

Russ, John C. The Image Processing Handbook. 2nd ed. Boca Raton, FL: CRC Press, 1995.

Solari, Stephen J., Digital Video and Audio Compression. New York: McGraw-Hill, 1997.

Utz, Peter. Today's Video. 4th ed. Jefferson, NC: McFarland and Company, Inc., 2006.

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